

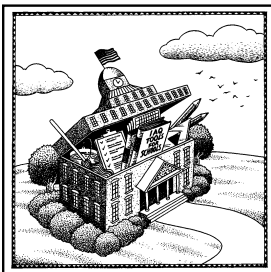


CASE STUDY

SHAMONA CREEK ELEMENTARY SCHOOL

Downingtown Area School District, Downingtown, Pennsylvania

Indoor Air Quality



Tools for Schools

***"We keep a log
of student
visits to our
health room
and even
during allergy
season
student visits
declined
dramatically.
We attribute
this to the
IAQ Tfs Kit."***

*-Mr. Leigh Abbott
Principal*

Shamona Creek Elementary School, constructed on 63 acres of former farmland, opened in 1990. Although certain sections of the school are one story, the school is mainly a two-story building with a brick exterior measuring 63,000 square feet. The metal roof initially brought indoor air quality (IAQ) issues to the attention of school personnel, as it leaked profusely due to improper installation. The plywood and insulation under the roof absorbed excess moisture and became saturated with mildew and mold. This led to severe moisture problems indoors, including mildew and mold on books, furniture, and walls throughout the school.

By 1994, school officials had received numerous complaints associated with indoor air quality, primarily regarding odor and mildew. They realized that the leaking roof was causing an increasing number of IAQ problems and therefore, hired a consultant to perform IAQ tests to verify the presence of mildew, airborne contaminants, harmful biological

organisms, and airborne gases. Quick-fix solutions were implemented such as adjusting temperature settings and fan speeds, and performing some additional house cleaning procedures. These produced minimal results with no long-term improvements.

Approach—Project Description

School Description

Downingtown Area School District (DASD), located in historic Chester County in southeastern Pennsylvania, includes the Downingtown Borough and the townships of East Brandywine, East Caln, Upper Uwchlan, Uwchlan, Wallace, West Bradford, and West Pikeland. DASD is composed of nine elementary schools (K-5), two middle schools (6-8), a ninth grade center and two senior high schools, one of which is undergoing renovations. Shamona Creek uses a chilled water air-conditioning system and gas and oil powered boilers to heat the air during colder weather. All exterior classrooms have unit ventilators to pull fresh air from outside, while the interior classrooms share a common duct referred to as a plenum. The plenum is shared by 15 classrooms and it provides fresh air through ceiling vents. Shamona Creek Elementary School was among the first of these schools to implement EPA's *Indoor Air Quality Tools for Schools (IAQ Tfs)* Program and Kit.

IAQ Team

Gil Lappano, Director of Facilities, Planning, and Management for DASD, was determined to raise the awareness of IAQ and establish long-term solutions for Shamona Creek Elementary and other schools in the District. The first step in this process was to obtain the support of the DASD School Board and the Administrators, who agreed that IAQ was an important issue and that the district needed a strategic IAQ plan.

In 1998, the District decided to pilot test EPA's *IAQ Tfs* Program and Kit in Shamona Creek, Bradford Heights, and Brandywine elementary schools. The DASD Facilities Department, with the assistance of EPA Region 3, conducted a complete walkthrough of each school, yielding specific recommendations for IAQ improvements. As part of this effort, they conducted kick-off meetings with the principal of each school and trained school staff including teachers, custodians, and maintenance and food service personnel.

The *IAQ Tfs* Program quickly became a part of the daily routine for IAQ Team members and staff at each school. Of the *IAQ Tfs* Kit checklists distributed, 80 percent were completed and returned to the appropriate Team member.

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“Since we have been using the IAQ TFS Kit, overall district-wide we have had less IAQ problems and fewer complaints.”

*-Gil Lappano
Director of Facilities,
Planning, and
Management*

Problem Identification

Problems identified on the school walkthroughs and completed checklists included:

- Stains and fungal/mold growth on ceiling tiles due to the leaking roof.
- Condensation, mold, and mildew accumulation in carpets and on furniture, walls, books and stuffed animals due to improper temperatures.
- Airflow problems in classrooms due to the accumulation of materials on unit ventilators and debris in the units.
- Unbalanced HVAC systems.
- Ventilation problems due to dysfunctional dampers and motors.
- Animals and vegetation for educational purposes.
- Cleaners and solvents not purchased or approved by the school district.
- Air filters in need of cleaning or replacement.
- Severe ponding issues due to improperly installed downspouts and changes in land contours.

Lessons Learned

Short-Term Solutions

School officials considered the IAQ complaints along with the results of checklists and walkthroughs when prioritizing the improvements. The first major improvement was a new roof for the school, including complete replacement of the plywood sheathing. The roof installation was completed in the spring of 1998. The next focus was the ventilation system. Dampers were reconditioned and adjusted, and new, efficient motors were installed. To cut down on moisture problems, ventilation drip pans were removed, cleaned, and treated with germicides to prevent mildew and mold accumulation. Pipe insulation that contained mold and mildew was removed or mitigated. An energy monitoring system was also installed.

Due to the noticeable build-up of mold and mildew in the classrooms, several items had to be disposed of and replaced. Items that are particularly susceptible to dust or moisture accumulation, such as stuffed animals and upholstered chairs, were removed from the classrooms. The teachers were compensated for personal articles that were destroyed.

Long-Term Practices and Policies

Shamona Creek has been actively participating in the *IAQ TFS* Program for more than three years. IAQ complaints have dropped considerably since 1997, from one per month to three per year. DASD plans to enroll three schools in their *IAQ TFS* Program each year until all schools are active participants and implementing good IAQ strategies. Uwchlan Hills, Brandywine Wallace, and Beaver Creek elementary schools began the *IAQ TFS* Program in the fall of 1999 and are in the process of implementation. This year, three more schools (West Bradford, East Ward and Pickering Valley) will be enrolled.

DASD is very pleased with the results from using the *IAQ TFS* Kit and the positive reaction of school staff involved. Participation has allowed the District to reduce expenditures on environmental consultants and provide a healthier environment for faculty and students. In collaboration with EPA, the District plans to make the *Indoor Air Quality Tools for Schools* Program and Kit standard operating procedure.

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